

Environmental influences on the pace of brain development

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Abstract

Childhood socio-economic status (SES), a measure of the availability of material and social resources, is one of the strongest predictors of lifelong well-being. Here we review evidence that experiences associated with childhood SES affect not only the outcome but also the pace of brain development. We argue that higher childhood SES is associated with protracted structural brain development and a prolonged trajectory of functional network segregation, ultimately leading to more efficient cortical networks in adulthood. We hypothesize that greater exposure to chronic stress accelerates brain maturation, whereas greater access to novel positive experiences decelerates maturation. We discuss the impact of variation in the pace of brain development on plasticity and learning. We provide a generative theoretical framework to catalyse future basic science and translational research on environmental influences on brain development. Evidence suggests that socio-economic status can affect not only the outcome of structural and functional development of the brain but also its rate. Tooley, Bassett and Mackey review this evidence and suggest that the valence and frequency of early experiences interact to influence brain development.